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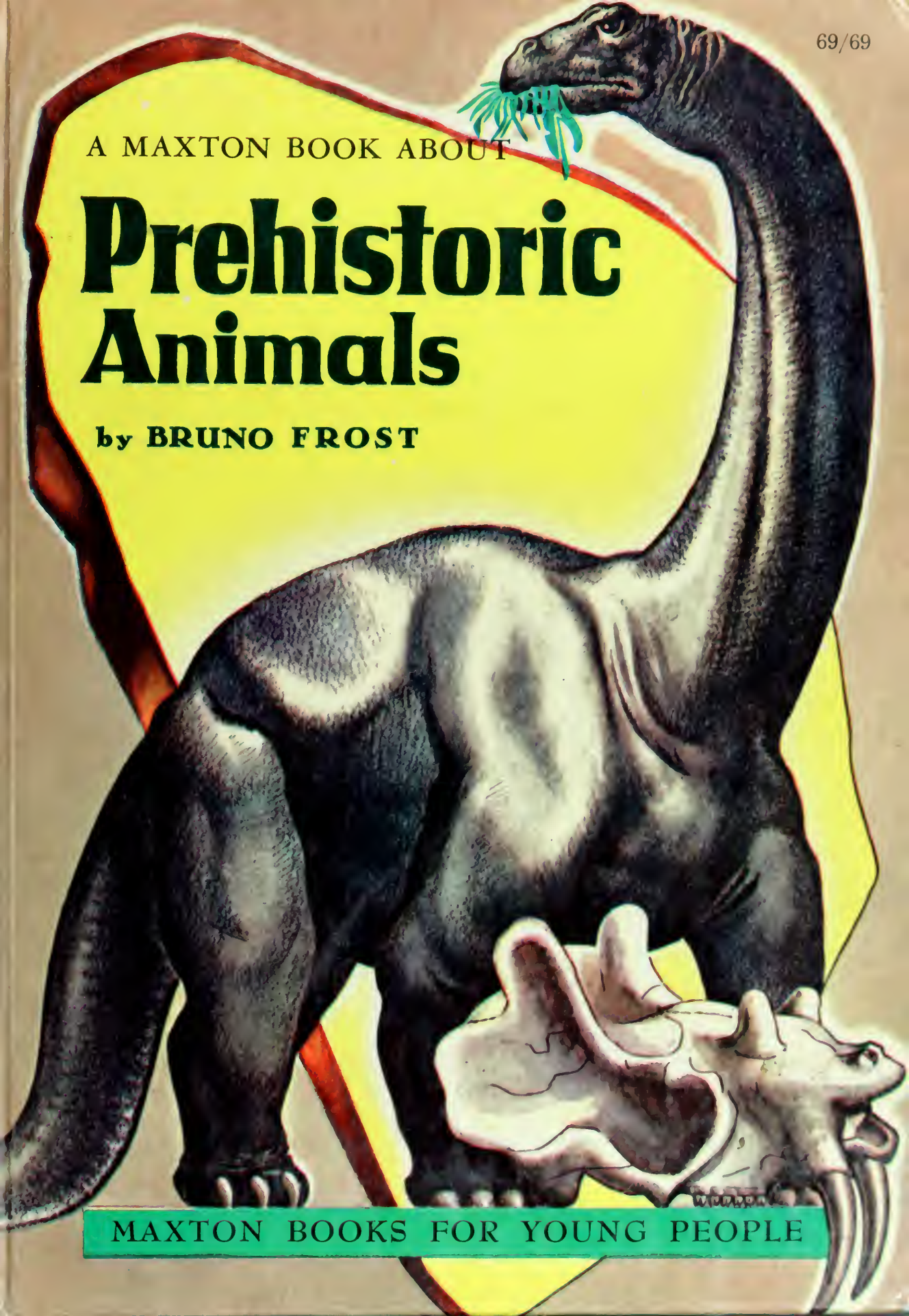
A MAXTON BOOK ABOUT

Prehistoric Animals

by BRUNO FROST



MAXTON BOOKS FOR YOUNG PEOPLE

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Christmas 1962

A MAXTON BOOK ABOUT

Prehistoric Animals

by

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Maxton Publishing Corporation
New York

LIBRARY OF CONGRESS CATALOG CARD NUMBER: 56-58297

12345678061

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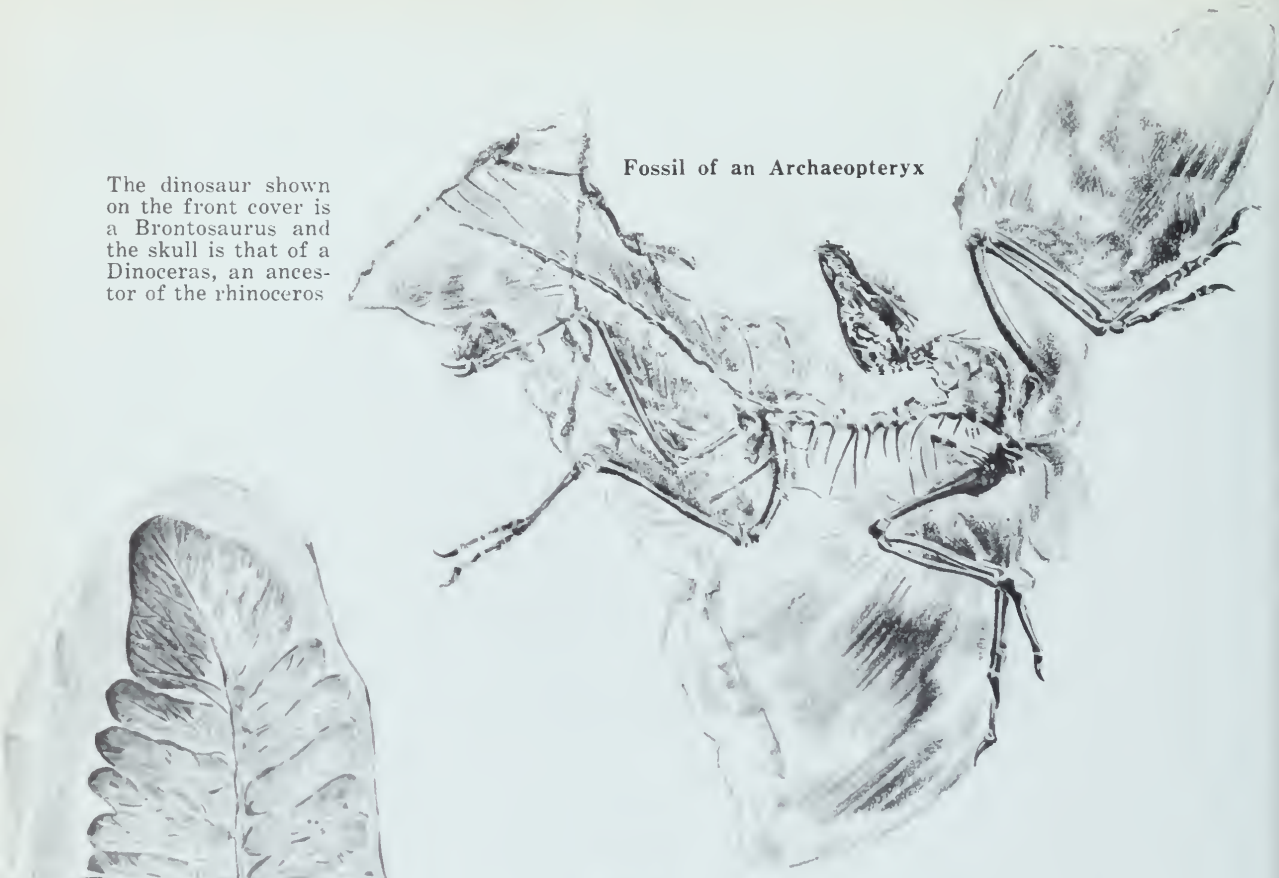
Manufactured in the United States of America. Published simultaneously in Canada by The Ryerson Press, Toronto

The dinosaur shown on the front cover is a Brontosaurus and the skull is that of a Dinoceras, an ancestor of the rhinoceros

Fossil of an Archaeopteryx



What are fossils?

Since prehistoric times man has been curious about the things around him — the stars, the shape of the earth, the age of the earth, and what has happened since the beginning of time.

Many strange objects have been found in the earth's rocks. But it was not until the 15th century that man understood that some of these were the remains or impressions of very old animals and plants. These are called fossils. The rocks of the earth were laid down in layers on the bottom of oceans and lakes many millions of years ago. Most of these rock layers contain fossils of the animals that lived long ago.

When the first tiny animals and plants formed in the seas they had no hard shells or skeletons. But about 500 million years ago animals developed skeletons. These shells and skeletons left marks in the mud which in time turned to stone.

Dimetrodon *(die-ME-tro-don)*

Fin-back

Dimetrodon was one of the early reptiles that lived at the same time as did *Seymouria*. This large animal that grew to a length of eleven feet, is sometimes called the "fin-back." The strong legs enabled this reptile to move about easily on the land and with its large head and the long mouth full of sharp teeth, *Dimetrodon* must have been one of the fiercest animals of his day. It fed on smaller animals and fish. Such meat eaters are called carnivores.

The large "sail" that rose nearly three feet above the back made this one of the strangest of all animals; unlike any beast alive today. What was this large "sail-fin" used for? Scientists think it protected *Dimetrodon* from attack or was a device for controlling the body temperature, a sort of radiator.

Cheirolepis *(kie-roh-LEEP-is)*

The first animals which lived on the earth had no backbones. These were animals similar to the snails, corals and clams that live near the seashores now. All of these ancient creatures made their homes in the sea. No animals or plants lived on the land.

About 350 million years ago, new kinds of animals appeared in the seas. These were the vertebrate animals, because they had a backbone much like many animals have today. The first vertebrates were fish-like creatures.

The ancient seas soon became the home of many different kinds of vertebrate animals. Some of these looked very much like the sharks that live in the oceans today. Others were very peculiar looking. Many were quite small. Some were eel-shaped while others were very flat with heavy plates of bony armor covering their heads. *Cheirolepis* was one of the strange fishes that lived during this age of fishes 300 million years ago.

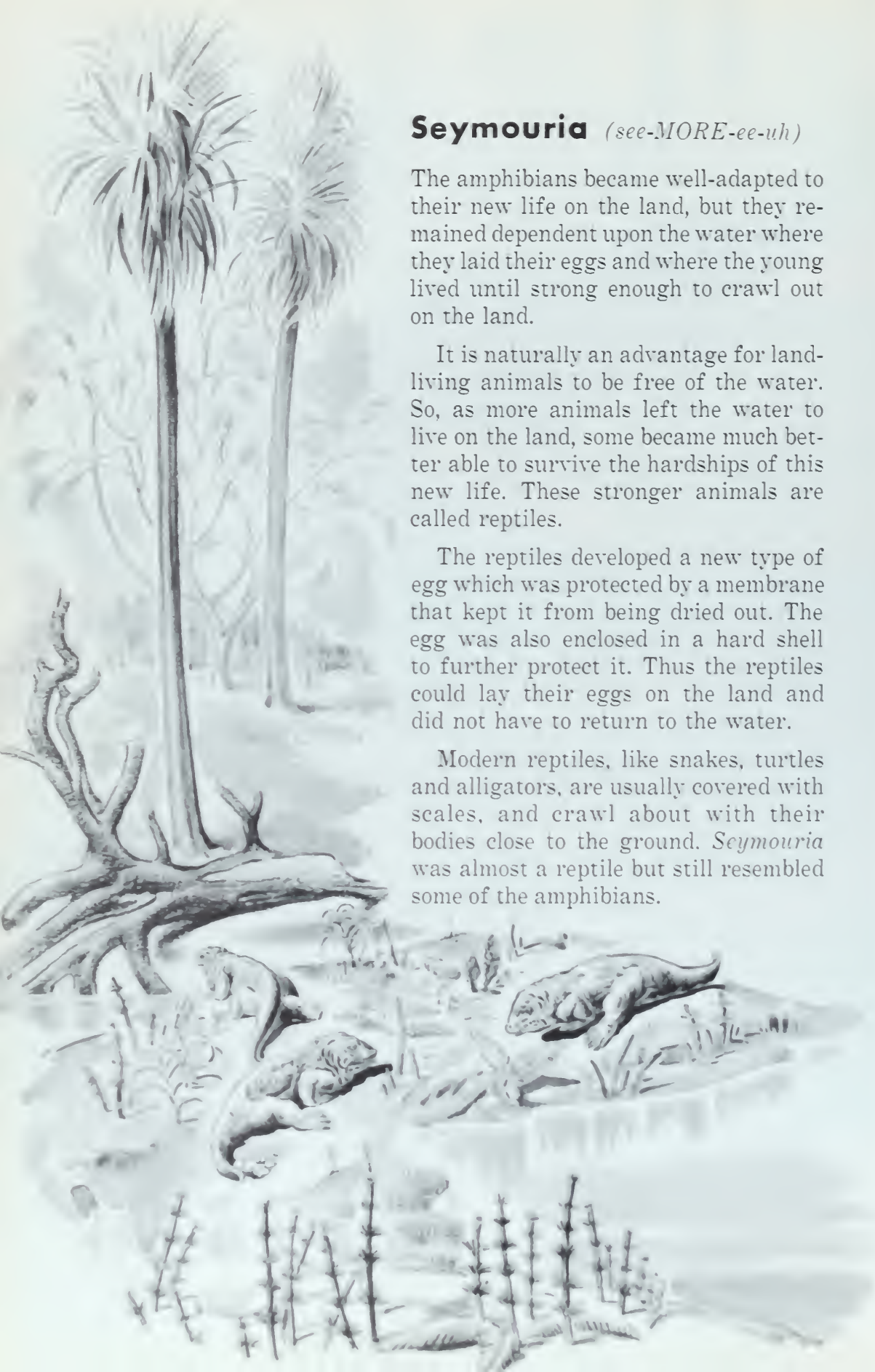
Diplovertebron *(dip-loh-VER-tee-bron)*

During the age of fishes all the animals lived in and depended upon the seas, lakes and rivers. It was only natural, though, that life should eventually spread onto the land areas beside the seas.

This change from life in the water to life on the land required many changes in animal shapes and structure. Instead of taking air out of the water by means of gills as the fish do, the first land animals had to develop a new breathing apparatus to allow them to breath the air directly.

After living in the water, the first vertebrates to venture out on the land had to protect themselves from the sun so that they did not become dried out. The fish fins of course were not much help out of the water, so the fins gradually changed into legs so that these creatures could move about on the land.

The first animals to venture out of the water are called amphibians because they could live and breathe both on land and in the water. *Diplovertebron* was one of these early amphibians. The short legs enabled it to move about on the land, but it still had a flat fish-like tail to help it swim during short visits to the water.



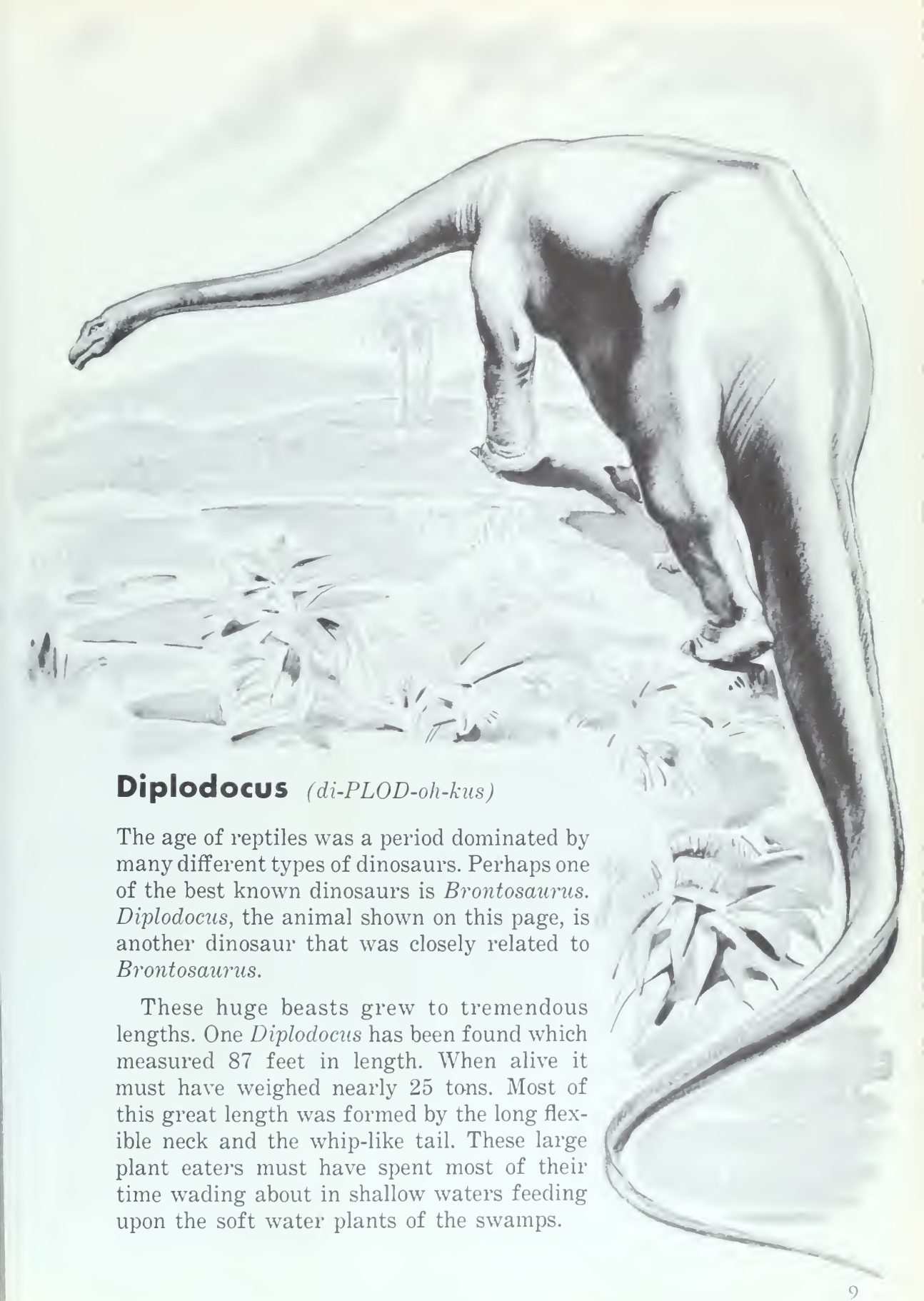
Seymouria *(see-MORE-ee-uh)*

The amphibians became well-adapted to their new life on the land, but they remained dependent upon the water where they laid their eggs and where the young lived until strong enough to crawl out on the land.

It is naturally an advantage for land-living animals to be free of the water. So, as more animals left the water to live on the land, some became much better able to survive the hardships of this new life. These stronger animals are called reptiles.

The reptiles developed a new type of egg which was protected by a membrane that kept it from being dried out. The egg was also enclosed in a hard shell to further protect it. Thus the reptiles could lay their eggs on the land and did not have to return to the water.

Modern reptiles, like snakes, turtles and alligators, are usually covered with scales, and crawl about with their bodies close to the ground. *Seymouria* was almost a reptile but still resembled some of the amphibians.



Diplodocus *(di-PLOD-oh-kus)*

The age of reptiles was a period dominated by many different types of dinosaurs. Perhaps one of the best known dinosaurs is *Brontosaurus*. *Diplodocus*, the animal shown on this page, is another dinosaur that was closely related to *Brontosaurus*.

These huge beasts grew to tremendous lengths. One *Diplodocus* has been found which measured 87 feet in length. When alive it must have weighed nearly 25 tons. Most of this great length was formed by the long flexible neck and the whip-like tail. These large plant eaters must have spent most of their time wading about in shallow waters feeding upon the soft water plants of the swamps.

Brachiosaurus *(bray-kee-oh-SO-rus)*

Another relative of *Brontosaurus* and *Diplodocus* is called *Brachiosaurus*. Although not quite as long as *Diplodocus*, this creature reached a length of nearly 80 feet. *Brachiosaurus* was, however, the heaviest animal ever to roam about on the land. Its total weight when alive, must have been close to 50 tons. *Brachiosaurus*, like *Diplodocus* and *Brontosaurus*, spent most of its time in the swamps searching for food.

Brachiosaurus was well adapted for this type of life. The nostrils were not located at the front of the snout as in most reptiles, but were placed on top of the strange looking hump on its head. With the nostrils so located, it was possible for this reptile to stay almost completely submerged. It needed only to raise this hump above the surface of the water in order to breath. This made it possible for *Brachiosaurus* to stay almost completely hidden from its enemies while it fed on the soft water plants.

Archaeopteryx

(ar-kee-OP-ter-iks)

Ancient Wing

The first birds did not appear until about 150 million years ago during the reign of the dinosaurs. Unusually well preserved fossils have been found in a limestone in Germany which clearly show the impressions left by the wing and tail feathers.

This earliest known bird has been named *Archaeopteryx*. The feathers show us that this was a true bird, although it looks much like a reptile, and unlike modern birds its jaws were lined with needle-like teeth.

Pteranodon *(tee-RAN-oh-don)*

Flying Reptile

The birds were not the only animals to conquer the air. The reptiles, which had already conquered the land, include another group of animals that competed with the birds for control of the skies. *Pteranodon* was one of the largest of these flying reptiles. Its wing span often reached a length of 25 feet. The long hollow bones of the single wing finger supported a large wing membrane that stretched between the front and hind legs.

Hesperornis *(hes-per-OR-nis)*

Western Bird

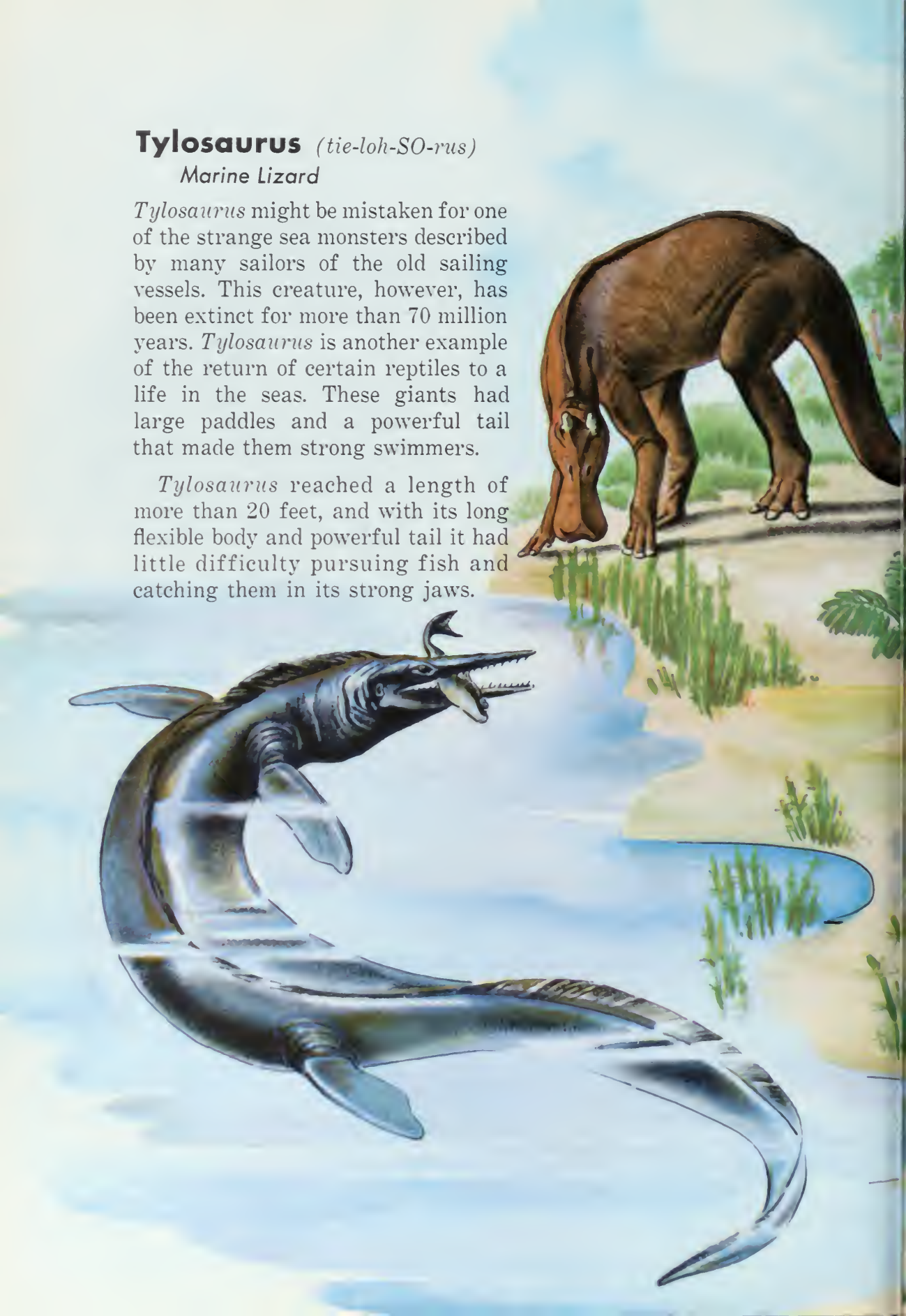
Another of the first known birds lived in the central part of North America. This bird, shown opposite, is known as *Hesperornis.* Although birds are usually thought of as animals of the air, there have been in the past and there still are today, certain birds which do not fly. The penguin is such a modern bird. Like the penguin, *Hesperornis* could not fly. It spent most of its time swimming on and beneath the waters of ancient seas. The long beak armed with many sharp teeth was well adapted for catching the small fish which formed its diet.

Tylosaurus *(tie-loh-SO-rus)*

Marine Lizard

Tylosaurus might be mistaken for one of the strange sea monsters described by many sailors of the old sailing vessels. This creature, however, has been extinct for more than 70 million years. *Tylosaurus* is another example of the return of certain reptiles to a life in the seas. These giants had large paddles and a powerful tail that made them strong swimmers.

Tylosaurus reached a length of more than 20 feet, and with its long flexible body and powerful tail it had little difficulty pursuing fish and catching them in its strong jaws.



Trachodon

(TRAY-koh-don)

Duck-billed Dinosaur

About 100 million years ago, during the age of the reptiles, there lived a group of strange dinosaurs that have become known as the "duck-billed" dinosaurs. This name is very appropriate, because their mouth was shaped like a broad flat bill that looks very much like a duck's bill. *Trachodon* probably used his bill to grub in the mud of shallow swamps and lakes in search of food. *Trachodon* also had webbed feet as a duck does. These helped in swimming and in walking about on the soft swamp bottoms.

Protoceratops

(pro-to-SER-a-tops)

First-horned Face

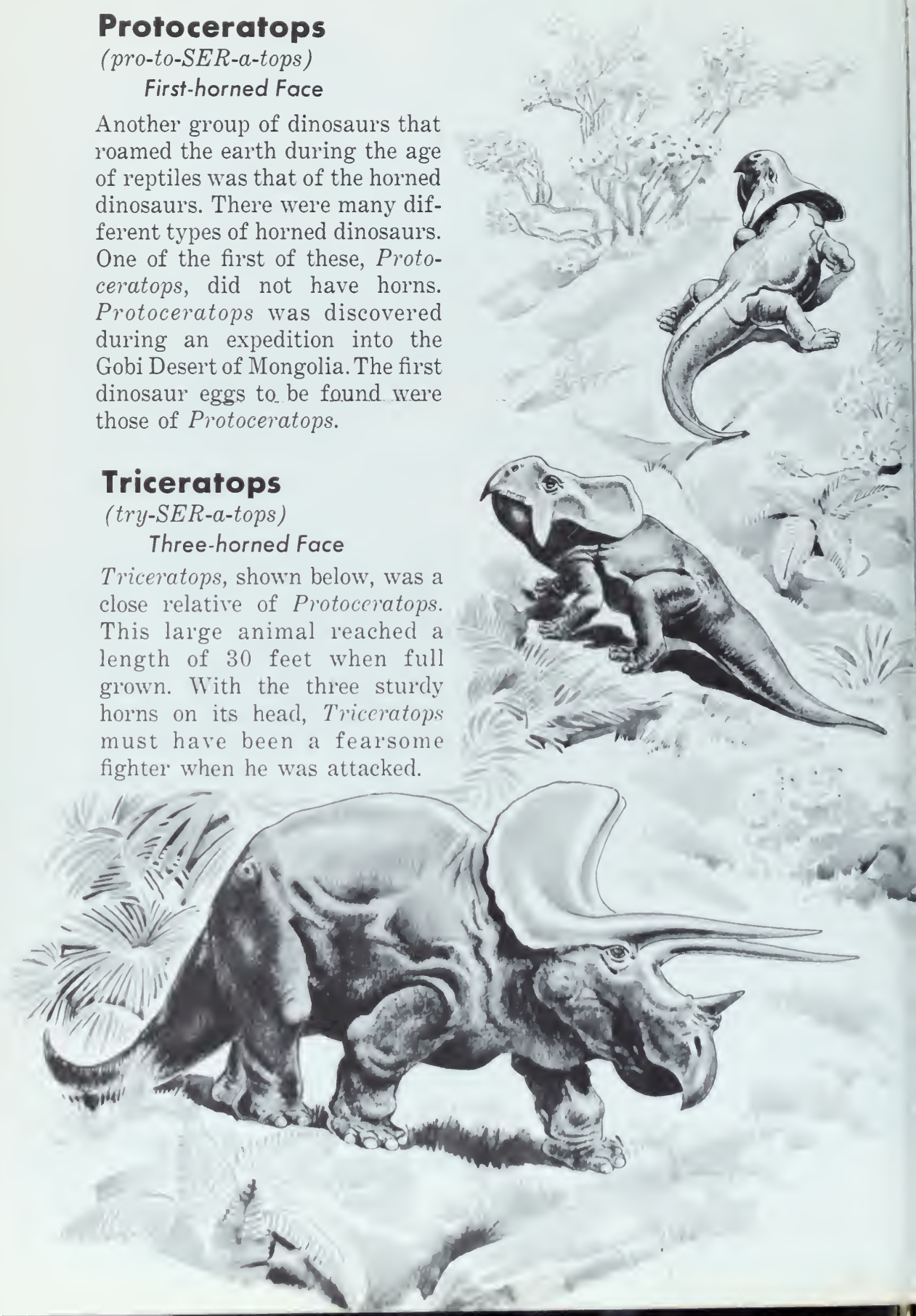
Another group of dinosaurs that roamed the earth during the age of reptiles was that of the horned dinosaurs. There were many different types of horned dinosaurs. One of the first of these, *Protoceratops*, did not have horns. *Protoceratops* was discovered during an expedition into the Gobi Desert of Mongolia. The first dinosaur eggs to be found were those of *Protoceratops*.

Triceratops

(try-SER-a-tops)

Three-horned Face

Triceratops, shown below, was a close relative of *Protoceratops*. This large animal reached a length of 30 feet when full grown. With the three sturdy horns on its head, *Triceratops* must have been a fearsome fighter when he was attacked.



Parasaurolophus *(par-a-sore-oh-LOAF-us)*

Crested Dinosaur

This peculiar looking dinosaur was related to the *Trachodon* and was also one of the "duck-billed" dinosaurs. *Parasaurolophus*, however, developed a new and strange feature in the long, curved crest on its head. This crest was formed of bone and was connected with the nostrils. It was not a horn such as the horned dinosaurs had.

Just how this animal used his crest is not known. Since *Parasaurolophus* spent much of his time in the water looking for water plants, perhaps this crest helped to keep the water out of his lungs when the head was submerged. Or perhaps air was stored in this crest so that *Parasaurolophus* could remain underwater longer.

Tyrannosaurus *(ti-ran-oh-SO-rus)*

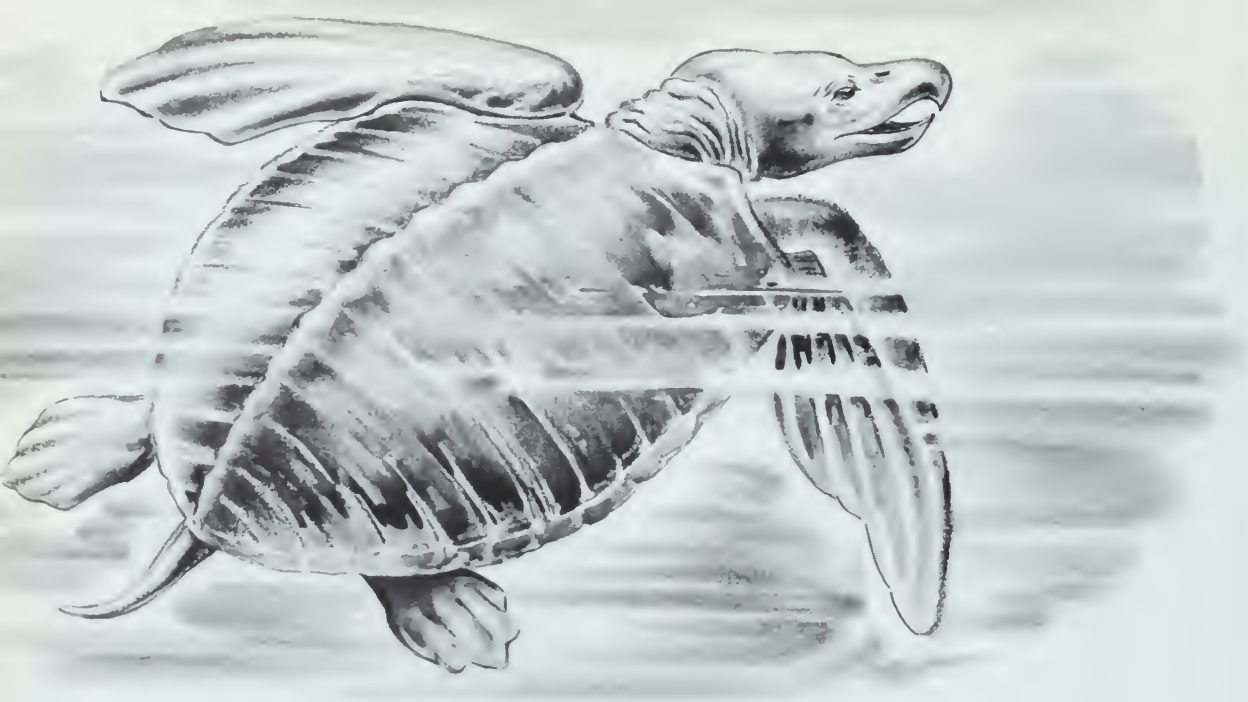
Tyrant King

Tyrannosaurus is the most famous of all the strange and giant dinosaurs. *Tyrannosaurus* has often been called the "king" of the dinosaurs. Indeed *Tyrannosaurus* must have been a terrifying animal. It stood almost 20 feet high and was nearly 50 feet long. This is the largest carnivore ever to roam over the land. The powerful hind legs allowed *Tyrannosaurus* to run very fast in order to pursue its fleet-footed prey. The huge head contained enormous jaws which were lined with rows of long, very sharp, knife-like teeth. Some of these teeth were over six inches long.

Palaeoscincus *(pay-lee-oh-SKINK-us)*

Reptilian Tank

The strange beast shown below might well be called a "reptilian tank," because it was well protected by an armor of heavy bony plates and long sharp spikes. *Palaeoscincus* was another of the plant-eating dinosaurs. This dinosaur did not have to run fast in order to escape from his flesh-eating enemies. The long spikes and heavy armor gave *Palaeoscincus* ample protection from such dangerous animals.



Archelon *(AHR-ke-lon)*

Giant Turtle

Turtles are familiar animals to everyone, but one turtle that is not so well known is the giant turtle called *Archelon* that lived in the ancient seas almost 100 million years ago. The little box turtles that are sometimes found in the garden would certainly have been midgets alongside this giant that measured nearly 12 feet in length.

The Age of Mammals

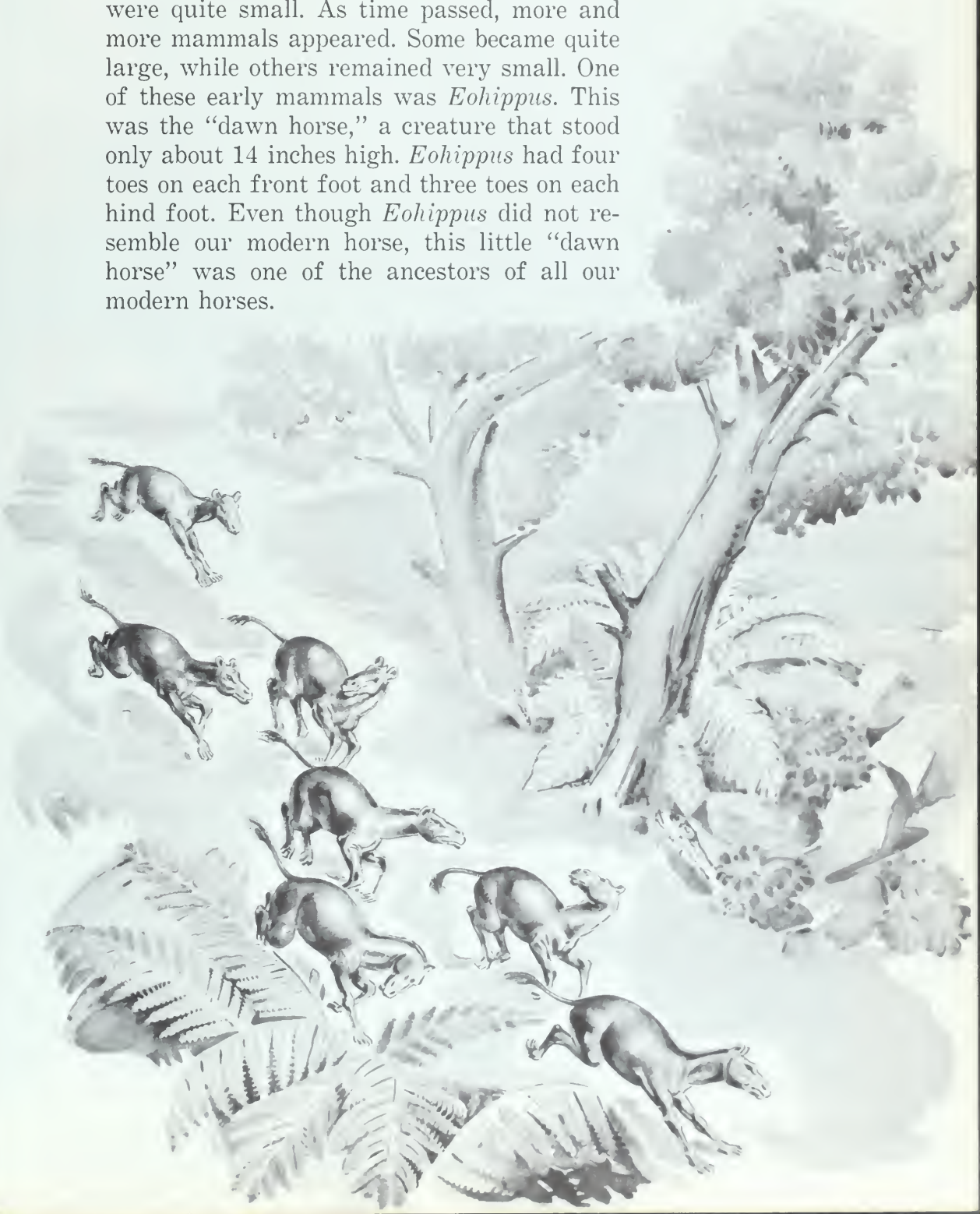
The dinosaurs ruled the earth for nearly 140 million years, but about 75 million years ago their rule came to an end. The dinosaurs died out and only a few reptiles such as the snakes, turtles, and alligators survived. With the end of the dinosaurs, some new vertebrates came on the scene and soon ruled the land as the dinosaurs had before. These new animals were the mammals. Mammals still are the dominating land animals today.

The mammals differ from reptiles in many ways. Instead of being covered with scales, most mammals are covered with fur or hair. They are not "cold-blooded" like the reptiles, but are "warm-blooded." Mammals do not lay eggs as most reptiles do. The young mammals are born alive. The dogs, horses, elephants and even men are examples of modern mammals.

Eohippus *(ee-oh-HIP-us)*

Dawn Horse

Early in the age of mammals, most of the creatures that wandered about the country were quite small. As time passed, more and more mammals appeared. Some became quite large, while others remained very small. One of these early mammals was *Eohippus*. This was the "dawn horse," a creature that stood only about 14 inches high. *Eohippus* had four toes on each front foot and three toes on each hind foot. Even though *Eohippus* did not resemble our modern horse, this little "dawn horse" was one of the ancestors of all our modern horses.



Stegosaurus *(steg-oh-SO-rus)*

Armored Dinosaur

Not all of the reptiles returned to live in the sea. After the rise of the reptiles, there appeared many large and strange reptiles which are called dinosaurs. The dinosaurs soon became the dominant land animals. The period of time when the dinosaurs roamed the earth is called the age of reptiles.

Stegosaurus was one of the strangest dinosaurs with its two rows of large bony plates along its back. These plates provided protection against attack by other dinosaurs. *Stegosaurus* was also armed with four long spikes on his tail; a powerful weapon that warned all attackers away. *Stegosaurus* was a peaceful animal that spent his time feeding upon plants, but he must have been a fierce fighter when attacked.

Smilodon *(SMY-lo-don)*

Sabre-toothed Cat

Smilodon is one of the very famous animals that lived in the dark days of the past. More popularly called the "sabre-toothed" cat, this creature has attracted much attention because of the two very long teeth, shaped very much like curved knives or sabres. These teeth were so long that some people believe that *Smilodon* could not open his mouth far enough to bite his food. But this is not true. *Smilodon* had no trouble opening his mouth. He must have put those teeth to effective use in his attacks upon the other large animals that lived before and during the ice age. As you can imagine, the "sabre-toothed" cat was a ferocious meat eater.

Brontops *(BRON-tops)*

From the small mammals that lived early in the age of mammals, there developed other animals which became very large. One such group of animals was called the Titanotheres. *Brontops* was one of these early Titanotheres. Although it was not one of the largest of the Titanotheres, *Brontops* still grew to a length of 15 feet. This heavy, hoofed animal resembles our modern rhinoceroses, but was probably more closely related to the horse.

Baluchitherium *(ba-lou-chi-THE-ri-um)*

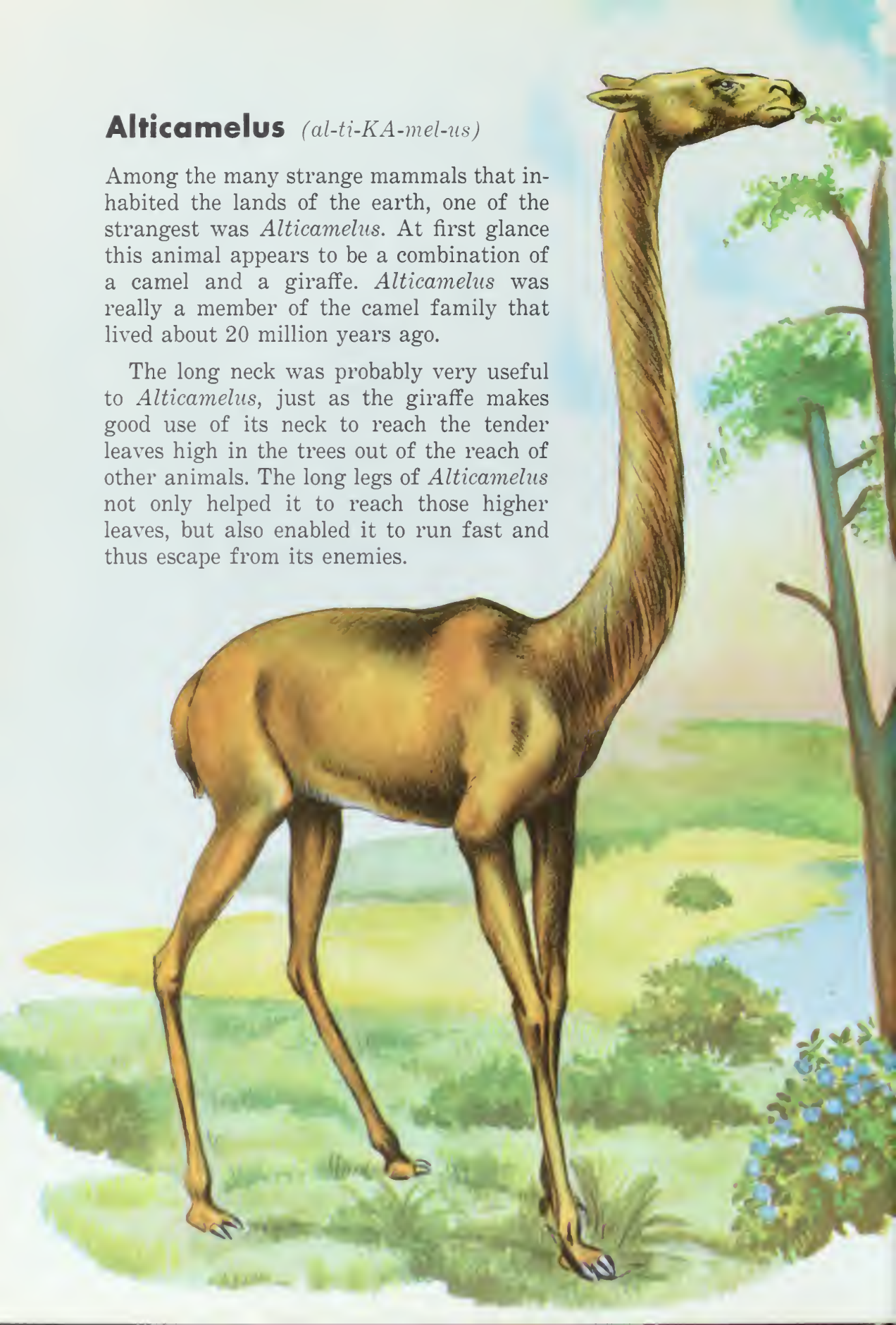
Giant Rhinoceros

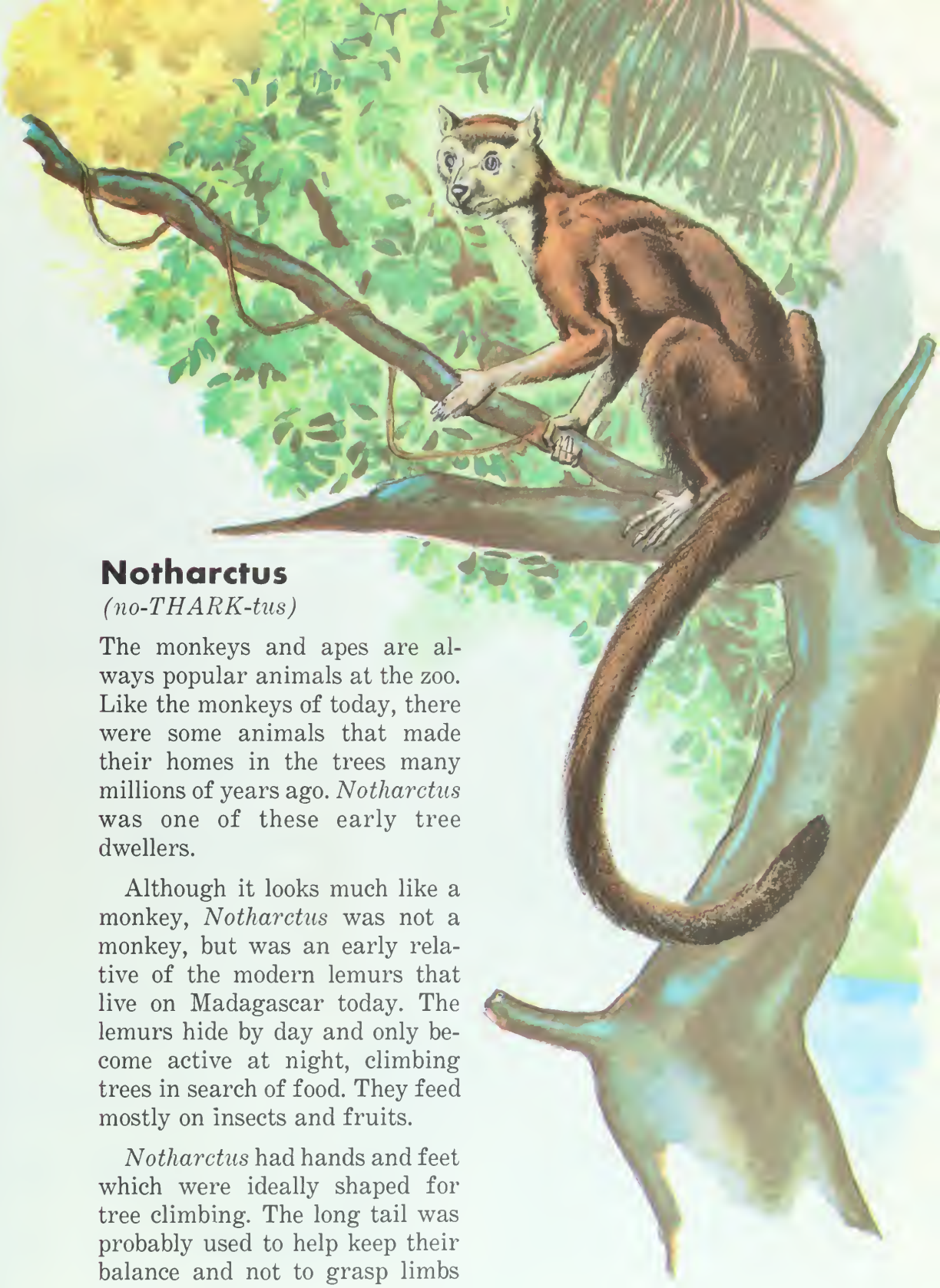
A rhinoceros seems like a large animal to us today, but nearly 40 million years ago there lived an even larger member of the rhinoceros family. *Baluchitherium* was the largest mammal that ever lived on the land. This giant rhinoceros stood 18 feet high at the shoulders and could reach even higher with its head. *Baluchitherium,* because of its great size, probably never had to fear the attacks of other animals.

Alticamelus *(al-ti-KA-mel-us)*

Among the many strange mammals that inhabited the lands of the earth, one of the strangest was *Alticamelus*. At first glance this animal appears to be a combination of a camel and a giraffe. *Alticamelus* was really a member of the camel family that lived about 20 million years ago.

The long neck was probably very useful to *Alticamelus*, just as the giraffe makes good use of its neck to reach the tender leaves high in the trees out of the reach of other animals. The long legs of *Alticamelus* not only helped it to reach those higher leaves, but also enabled it to run fast and thus escape from its enemies.





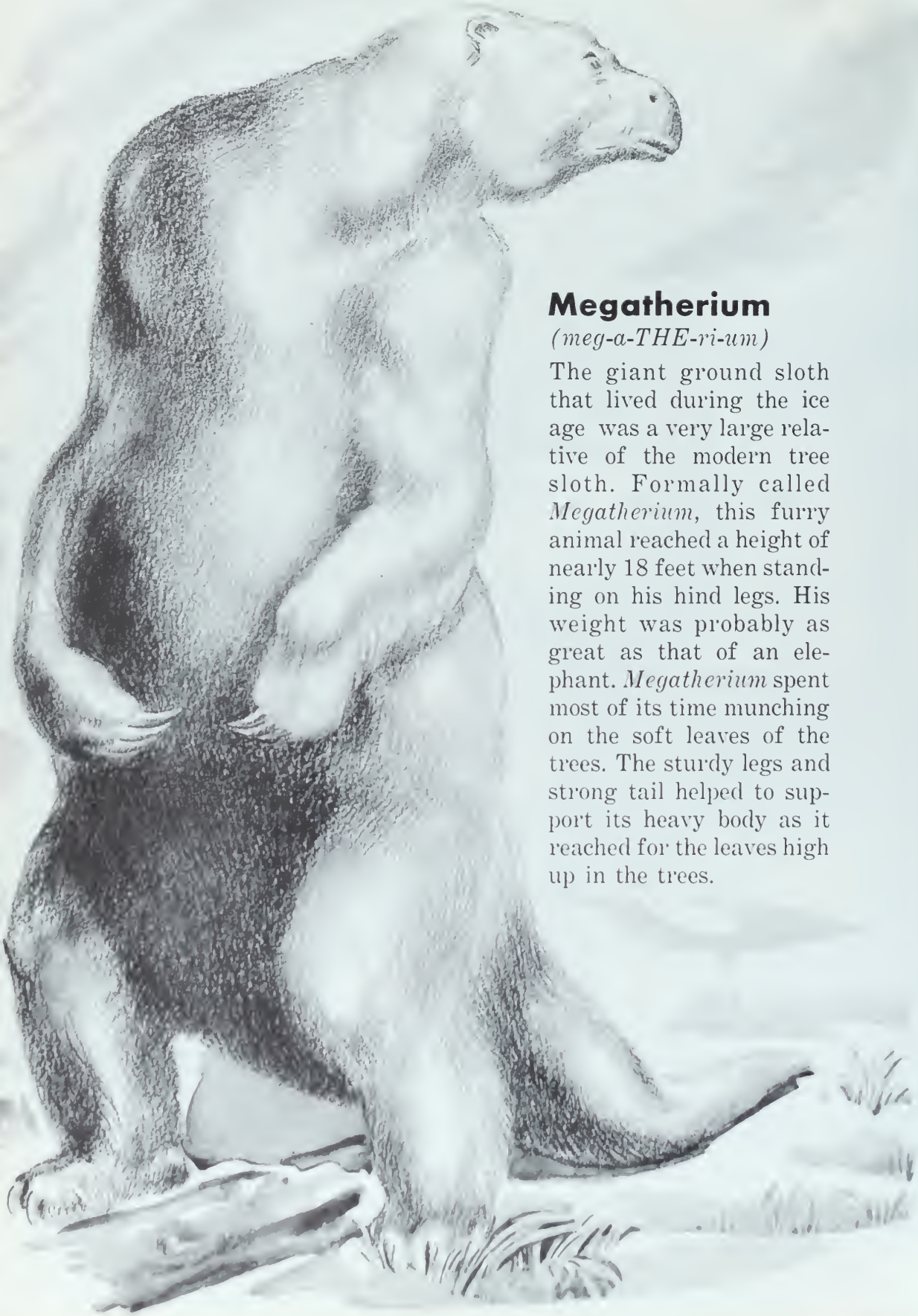
Notharctus

(no-THARK-tus)

The monkeys and apes are always popular animals at the zoo. Like the monkeys of today, there were some animals that made their homes in the trees many millions of years ago. *Notharctus* was one of these early tree dwellers.

Although it looks much like a monkey, *Notharctus* was not a monkey, but was an early relative of the modern lemurs that live on Madagascar today. The lemurs hide by day and only become active at night, climbing trees in search of food. They feed mostly on insects and fruits.

Notharctus had hands and feet which were ideally shaped for tree climbing. The long tail was probably used to help keep their balance and not to grasp limbs as the monkeys do.



Megatherium

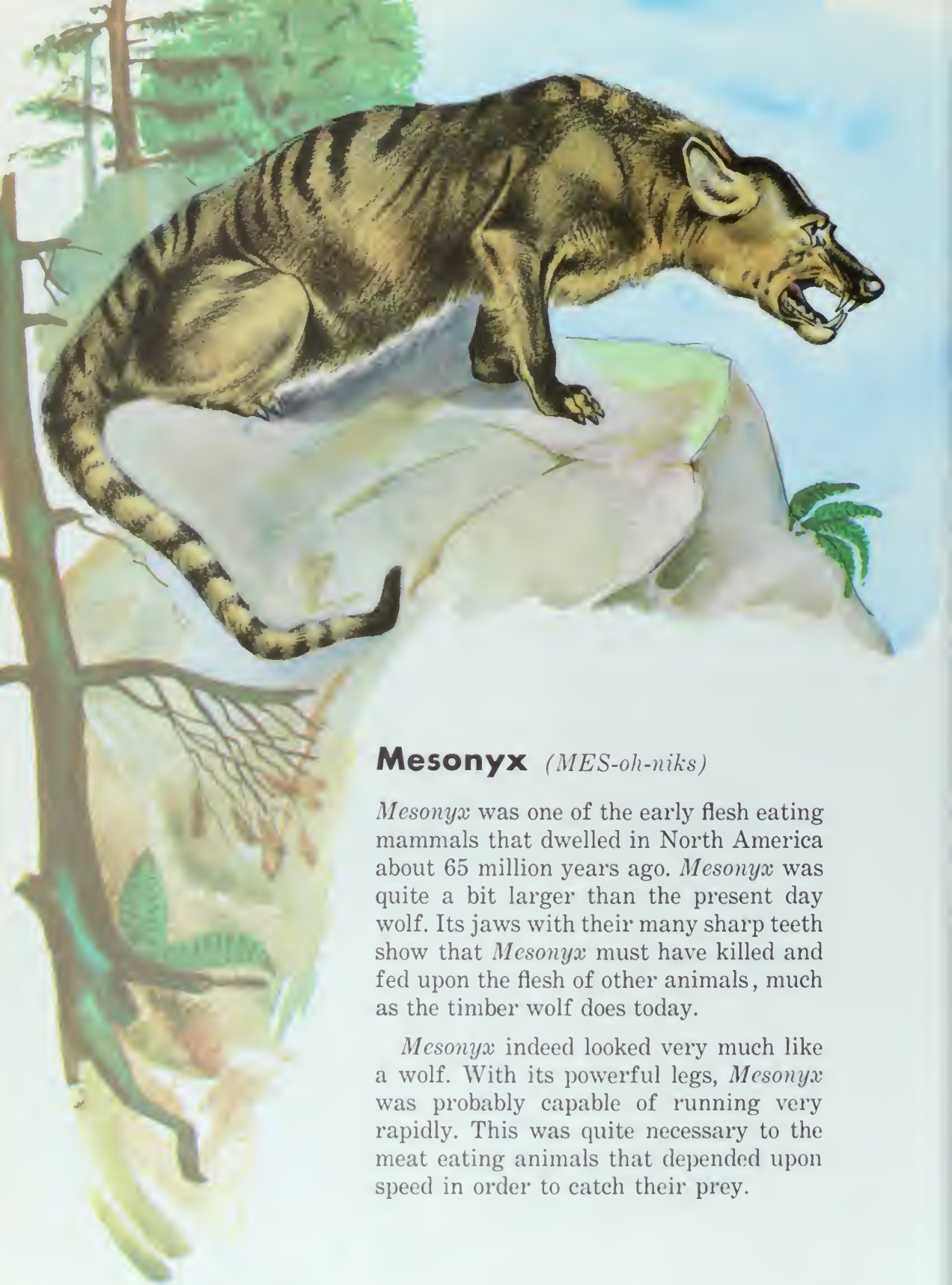
(meg-a-THE-ri-um)

The giant ground sloth that lived during the ice age was a very large relative of the modern tree sloth. Formally called *Megatherium*, this furry animal reached a height of nearly 18 feet when standing on his hind legs. His weight was probably as great as that of an elephant. *Megatherium* spent most of its time munching on the soft leaves of the trees. The sturdy legs and strong tail helped to support its heavy body as it reached for the leaves high up in the trees.

Woolly Rhinoceros

The rhinoceros family can be traced back almost to the beginning of the Age of Mammals — over 65 million years. One of the more recent members of this family is the Woolly Rhinoceros that lived during the great ice age.

This animal developed a very thick coat of fur to protect it from the cold climate of the ice age. Modern rhinoceroses do not need this thick coat of fur and have lost most of their hair because they live in the tropics. But even with his fur coat, the Woolly Rhinoceros looked very much like the African rhinoceros we know today.



Mesonyx *(MES-oh-niks)*

Mesonyx was one of the early flesh eating mammals that dwelled in North America about 65 million years ago. *Mesonyx* was quite a bit larger than the present day wolf. Its jaws with their many sharp teeth show that *Mesonyx* must have killed and fed upon the flesh of other animals, much as the timber wolf does today.

Mesonyx indeed looked very much like a wolf. With its powerful legs, *Mesonyx* was probably capable of running very rapidly. This was quite necessary to the meat eating animals that depended upon speed in order to catch their prey.

Mastodon

The mastodon, which is related to the elephants of today, lived during the ice age along with the woolly rhinoceros and the ground sloth.

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